

Request for Beam Time at M-Bottom
for
CDF Calorimeter/Chamber Test

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CDF
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We would like to request beam time at the M-Bottom beam line in the coming 1983 fall to 1984 spring beam cycle for tests of various CDF detector components.

The major item to be tested will be the final modules of the end plug e.m. and hadron calorimeters. The forward e.m. calorimeter prototype module will be tested, also.

There will be a minor program of testing the vertex TPC and forward muon chamber prototypes.

In order to accomplish all of these tests, we request an allocation of the integrated beam time of about 6 months.

I. Items to be Tested

Since the N-1 test beam line is expected to be occupied most of the time by the central calorimeter wedges, the rest of the components of CDF are likely to be tested at M-Bottom line. The major items currently scheduled are the end plug e.m. calorimeter and the end plug hadron calorimeter. The forward e.m. calorimeter prototype module is planned to be tested at this beam line in the later stage of the coming beam cycle. There will be minor scale tests of the forward muon drift chamber prototypes and the vertex TPC prototype, also.

II. What is to be tested

This is the third cycle of the beam test of the realistic CDF components and the stage of the test varies from pre-prototype tests to a final module test.

The end plug e.m. calorimeter (KEK-Tsukuba-Fermilab) has been prototyped and beam-tested twice and the coming beam cycle can be defined as "pre-calibration run" in which the final assembly will be tested for its general characteristics simultaneously trying to establish the procedure of the absolute energy calibration in order to prepare for the final absolute calibration run in the next beam cycle from summer 1984.

Especially important is the debugging of the charge amplifier-ADC system whose first batch is supposed to be delivered at the latter half of the coming beam cycle.

The end plug hadron calorimeter (LBL) prototype module was tested in the previous beam cycle. Since this calorimeter is quite similar in its design to the e.m. calorimeter, we could obtain a good experience on the operation and the nature of such chamber calorimeter from this beam test, although it was fairly short. Presently, the assembly line for the final chamber is in full operation and we expect to use the test beam for the "pre-calibration run" as described above in the coming beam cycle.

The forward e.m. calorimeter has been finalized in its design recently and people (Harvard-Brandeis) are currently

testing the first prototype chamber. The production line has been set up and it is expected to start full operation within this month. A portion of the final calorimeter will be brought into the test beam toward the end of the coming beam cycle.

The forward muon drift chamber (Wisconsin) is currently being designed using electrodeless drift tubes. In order to determine the tube dimensions which is crucially dependent on the rate capability, it is planned to test prototype chambers with various tube dimensions at the earliest beam availability. This will be a small scale test, both in physical size and in the time needed.

A minor scale test is planned for the vertex TPC to measure the general performance. The ion feedback and multi-track handling capability are within the major subjects to be studied.

There could possibly be other tests for CDF although they are not foreseen to be major activities.

III. Summary

End Plug E.M. Calorimeter: KEK-Tsukuba-Fermilab - M. Mishina

Purpose: Pre-calibration run with final assembly

- 1) measurement of general characteristics
- 2) debugging of new amplifier-ADC system
- 3) practice of absolute energy calibration

Past Beam Test:

- 1) Spring 1981 at M5. 10 \sqrt{s} 46 GeV e, π
1st prototype with 1/3 size module
- 2) Spring 1982 at M4. 25 \sqrt{s} 175 GeV, e, π
2nd prototype with full scale 30° sector

Reports:

- 1) Y. Hayashide et al., Nucl. Inst. Meth. 204 (1983)
361
- 2) S. Mikamo et al., Proc. Gas Calorimeter Workshop,
Fermilab Oct. 1982
- 3) Y. Hayashide et al., CDF Note 174, submitted to
Nucl. Inst. Meth.

Approximate Beam Time:

3 months integrated beam time from December.

Manpower:

- 3 staff + 1 grad student - 100%
- 2 staff + 4 grad students - temporary at beam time

4 engineers + 2 draftspersons + 1 technician ~ 50 -
100%

End Plug Hadro Calorimeter: LBL - W. Carithers

Purpose: Same as the end plug e.m. calorimeter

Past Beam Test:

Spring 1982 at M4, 25 ~ 175 GeV e, π

Report: To be presented at IEEE Conference in Fall 1983

Approximate Beam Time:

~ 2 months integrated beam time ~ Jan. to Feb.

Manpower:

3 staff + 1 technician - 100%

1 staff + 1-2 grad students - temporary at beam time

1 engineer - 50%

8 workers - 100%

Forward E.M. Calorimeter: Harvard-Brandeis - G. Brandenburg

Purpose:

- 1) Study of general characteristics on a portion of final assembly
- 2) Electronics debugging

Past Beam Test: None

Approximate Beam Time:

~ 3 weeks integrated beam time in April

Manpower:

5 staff: 100% - 5 grad students: temporary at beam time

1 staff: ~ 10%

Forward Muon Drift Chamber: Wisconsin - M. Sheaff

Purpose: Pre-prototype with various tube size

- 1) Rate capability
- 2) Position resolution
- 3) Angular dependence

Approximate Beam Time:

~ 3 weeks integrated beam time at the early period from
October

Specific Request:

High intensity desirably up to $\sim 10^6$ /spill

Manpower:

3 staff + 1 grad student - ~70-100%

2 staff + a few grad students - temporary at beam time

Vertex TPC: Fermilab - R. Kephart

Purpose: Prototype test

- 1) General characteristics
- 2) Rate capability related to ion feedback problem
- 3) Multi-track handling capability
- 4) Angular effect.

Approximate Beam Time: ~1 week integrated beam time

Manpower:

2 staff - 100%

1 staff - 50%